SECTION 02721
STORMWATER TREATMENT SYSTEM

PART 1.00 GENERAL

1.1 DESCRIPTION

A. Work included: The Contractor, and/or a manufacturer selected by the Contractor and approved by the Engineer, shall furnish all labor, materials, equipment and incidentals required and install all precast concrete stormwater treatment systems and appurtenances in accordance with the Drawings and these specifications.

1.2 QUALITY CONTROL INSPECTION

A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the sections shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections which have been damaged beyond repair during delivery will be rejected and, if already installed, shall be repaired to the Engineer’s acceptance level, if permitted, or removed and replaced, entirely at the Contractor's expense.

B. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface shall be dense, close textured and free of blisters, cracks, roughness and exposure of reinforcement.

C. Imperfections may be repaired, subject to the acceptance of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final acceptance. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi (28 MPa) at the end of 7 days and 5,000 psi (34 MPa) at the end of 28 days when tested in 3 inch (76 mm) diameter by 6 inch (152 mm) long cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs.

1.3 SUBMITTALS

A. Shop Drawings

The Contractor shall be provided with dimensional drawings and, when specified, utilize these drawings as the basis for preparation of shop drawings showing details for construction, reinforcing, joints and any cast-in-place appurtenances. Shop drawings shall be annotated to indicate all materials to be used and all applicable standards for materials, required tests of materials and design assumptions for structural analysis. Shop drawings shall be prepared at a scale of not less than 3/16-inches per foot (1:75). Six (6) hard copies of said shop drawings shall be submitted to the Engineer for review and approval.

B. As-Built Drawings

1. Submit one reproducible set of As-Built Drawings upon completion and acceptance of work.

2. As-Built Drawings shall be complete and shall indicate the true measurement and location, horizontal and vertical, of all new construction. As-Built drawings shall include a minimum of three (3) ties showing the distance to each installed structure from fixed permanent objectives. As-Built drawings shall also contain any additional information required by the municipality, and shall be stamped with the seal of a Licensed Land Surveyor.

PART 2.00 PRODUCTS

2.1 MATERIALS AND DESIGN

A. Concrete for precast stormwater treatment systems shall conform to ASTM C 857 and C 858 and meet the following additional requirements:

1. The wall thickness shall not be less than 6 inches (152 mm) or as shown on the dimensional drawings. In all cases the wall thickness shall be no less than the minimum thickness necessary to sustain HS20-44 (MS18) loading requirements as determined by a Licensed Professional Engineer.
2. Cement shall be Type II Portland cement conforming to ASTM C 150.
3. All sections shall be cured by an approved ASTM method. Sections shall not be shipped nor subject to loading until the concrete has attained a compressive strength of 4,000 psi (28 MPa) or until 28 days after fabrication and/or repair, whichever is the longer.
4. Pipe openings shall be sized to accept pipes of the specified size(s) and material(s), and shall be sealed by the Contractor with a hydraulic cement conforming to ASTM C 595M.

B. Construction joints shall be sealed with a butyl rubber-based sealant conforming to ASTM C 990.

C. Manhole riser sections, manhole steps, frames and covers shall be as specified by the manufacturer.

2.2 PERFORMANCE

A. Each stormwater treatment system shall adhere to the following performance specifications at the design treatment capacities, as listed below:

Each stormwater treatment system shall be capable of removing 80% of the net annual Total Suspended Solids (TSS) load based on a 50-micron particle size. Annual TSS removal efficiency models shall be based on documented removal efficiency performance from full-scale laboratory tests. Annual TSS removal efficiency models shall

only be considered valid if they are corroborated by independent third party field testing. Said field testing shall include influent and effluent composite samples from a minimum of ten storms at one location. Individual stormwater treatment systems shall have the Design Treatment Capacity recommended by the manufacturer, and shall not re-suspend trapped sediments or re-entrain floating contaminants at flow rates up to and including the specified Design Treatment Capacity.

Individual stormwater treatment systems shall have usable sediment storage capacity of not less than the volume recommended by the manufacturer. The systems shall be designed such that the pump-out volume is less than ½ of the total system volume. The systems shall be designed to not allow surcharge of the upstream piping network during dry weather conditions.

A water-lock feature shall be incorporated into the design of the stormwater treatment system to prevent the introduction of trapped oil and floatable contaminants to the downstream piping during routine maintenance and to ensure that no oil escapes the system during the ensuing rain event. Direct access shall be provided to the sediment and floatable contaminant storage chambers to facilitate maintenance. There shall be no appurtenances or restrictions within these chambers.

2.3 MANUFACTURER

A. The following stormwater treatment systems are acceptable:

1. Continuous Deflective Separator (CDS)
2. Downstream Defender ™
3. Stormceptor ®
4. Vortechs ™

The use of any other stormwater treatment system requires the written approval of the Engineer.

PART 3.00 EXECUTION

3.1 INSTALLATION

A. Each Stormwater Treatment System shall be constructed according to the sizes shown on the Drawings and as specified herein. Install at elevations and locations shown on the Drawings or as otherwise directed by the Engineer.

B. Place the precast base unit on a granular subbase of minimum thickness of twelve inches after compaction or of greater thickness and compaction if specified elsewhere. The granular subbase shall be checked for level prior to setting and the precast base section of the trap shall be checked for level at all four corners after it is set. If the slope from any corner to any other corner exceeds 0.5% the base section shall be removed and the granular subbase material re-leveled.

C. Prior to setting the precast roof section, bitumen sealant equal to ASTM C 990 shall be placed along the top of the baffle wall, using more than one layer of mastic if necessary, to a thickness at least 1-inch (25 mm) greater than the nominal gap between

the top of the baffle and the roof section. The nominal gap shall be determined either by field measurement or the shop drawings. After placement of the roof section has compressed the butyl mastic sealant in the gap, finish sealing the gap with an approved non-shrink grout on both sides of the gap using the butyl mastic as a backing material to which to apply the grout. Also apply non-shrink grout or Sikaflex-1a to the joints at the side edges of the baffle walls.

D. After setting the precast roof section of the stormwater treatment system, set precast concrete manhole riser sections, to the height required to bring the cast iron manhole covers to grade, so that the sections are vertical and in true alignment with a ¼-inch (6 mm) maximum tolerance allowed. Backfill in a careful manner, bringing the fill up in 6-inch (152 mm) lifts on all sides. If leaks appear, clean the inside joints and caulk with lead wool to the satisfaction of the Engineer. Precast sections shall be set in a manner that will result in a watertight joint. In all instances, installation of Stormwater Treatment Systems shall conform to ASTM specification C 891 “Standard Practice for Installation of Underground Precast Utility Structures”.

E. Holes made in the concrete sections for handling or other purposes shall be plugged with a nonshrink grout or by using grout in combination with concrete plugs.

F. Where holes must be cut in the precast sections to accommodate pipes, do all cutting before setting the sections in place to prevent any subsequent jarring which may loosen the mortar joints. The Contractor shall make all pipe connections.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT FOR PAYMENT

A. No measurement shall be made for this item. The bid items under this section are lump sum quantities.

4.2 PAYMENT

A. Payment for the scope of work specified herein, including all labor, materials, equipment and incidentals associated with Furnishing and Installing All Precast Concrete Stormwater Treatment Systems shall be paid for at the applicable Lump Sum price for Item 02721.1 stated on the Form for Bid.

Item No.	Payment Item	Unit
02721.1	Furnishing and Installing All Precast Concrete Stormwater Treatment Systems	Lump Sum

*** * * END OF SECTION * * ***